

HBD546 Durafet pH Electrodes and Accessories

70-82-25-144

Rev. 1

July 2013

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Revision 1 – July 2013

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About This Document

Abstract

This manual contains instructions for installation and use of the HBD546 pH electrodes.

Revision Notes

The following list provides notes concerning all revisions of this document.

Rev. ID	Date	Revision Details
1	July 2013	1 st Release

References

The following list identifies publications that may contain information relevant to the information in this document.

Support and Contact Information

For Europe, Asia Pacific, North and South America contact details, refer to the back page of this manual or the appropriate Honeywell Solution Support web site:








Honeywell Corporate www.honeywellprocess.com
Honeywell Process Solutions www.honeywellprocess.com/hbd-series
Training Classes <http://www.automationcollege.com>

Telephone and Email Contacts

Area	Organization	Phone Number
United States and Canada	Honeywell Inc.	1-800-343-0228 Customer Service 1-800-423-9883 Global Technical Support
Global Email Support	Honeywell Process Solutions	ask-ssc@honeywell.com

Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	This CAUTION symbol on the equipment refers the user to the Product Manual for additional information. This symbol appears next to required information in the manual.
	WARNING PERSONAL INJURY: Risk of electrical shock. This symbol warns the user of a potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 Vdc may be accessible. Failure to comply with these instructions could result in death or serious injury.
	ATTENTION, Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices
	Protective Earth (PE) terminal. Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	Functional earth terminal. Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to protective earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground. Functional earth connection. NOTE: This connection shall be bonded to Protective earth at the source of supply in accordance with national and local electrical code requirements.
	Chassis Ground. Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

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1. Introduction

1.1 About This Manual

Manual part of a set

This manual is part of a set documenting installation and use of the HBD546 pH Electrodes and associated accessories.

The set consists of the following manuals:

- this manual (70-82-25-144)
- Instruction manual for the pH instrument.

What this manual contains

This manual contains instructions for the installation and use of the HBD546 pH electrodes and associated accessories.

CAUTION

Read this electrode manual before installing and using the HBD Series electrodes. Failure to follow the installation instructions could result in damage to the equipment.

1.2 Overview

Honeywell's HBD Series of pH electrodes are for applications with high pressure and temperature as well high and low pH ranges. They are intended for the harshest of applications where traditional glass sensors and reference electrode technology do not stand up. The HBD Series combines the superior stability and ruggedness of the Durafet sensor with a unique reference technology that resists poisoning and fouling.

1.3 Description



The HBD546 offers a reliable combination style pH electrode with measuring and reference electrode together with an temperature sensor in a 1-piece corrosion resistant Kynar body.

The HBD546 electrode has two 3/4" NPT male threads for various mounting configurations. One can be used to thread the electrode into a pipe tee for in-line mounting. The other can be used with a pipe coupling and support pipe for submersion mountings.

1.4 Application Restrictions

Avoid using the Durafet series pH electrode with these chemicals and applications:

- Hydrofluoric acid
- High purity water (<10 $\mu\text{S}/\text{cm}$)
- Hot caustic (see Figure 1-1 below)

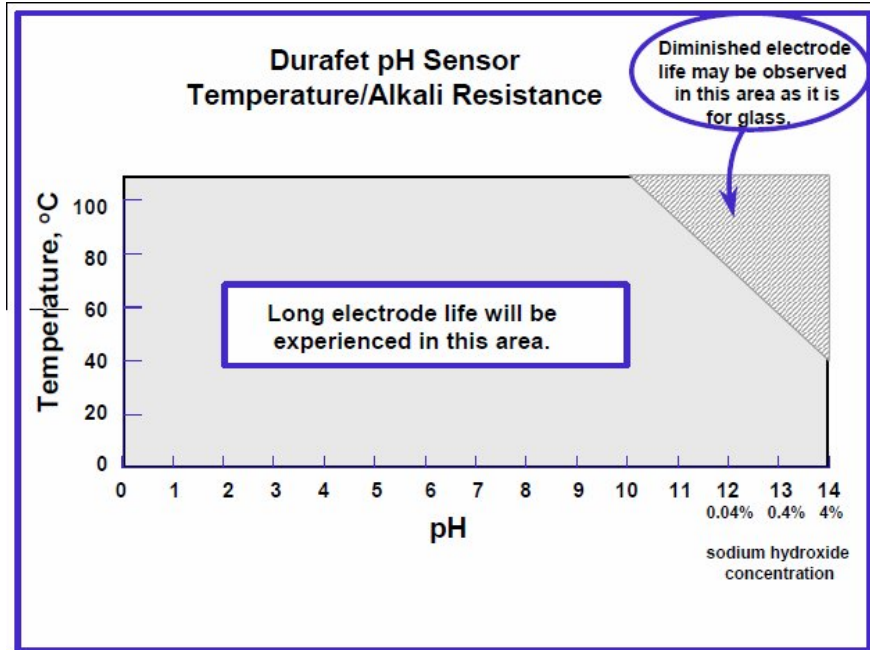


Figure 1-1 Temperature vs Alkali Resistance

2. Features & Specifications

2.1 Features

Table 2-1 Feature Summary

HBD546 Electrode	
<ul style="list-style-type: none"> • Non-Glass Ion Sensitive Field Effect Transistor (ISFET) pH sensor • Rugged, virtually non-breakable • Long lasting stability in the harshest of application environments Integral automatic temperature compensator 	<ul style="list-style-type: none"> • Chemically resistant Kynar body • Great for high temperature and high pressure applications • Can be used in both low and high pH conditions

2.2 Specifications

Table 2-2 Specification Summary

Electrode	
Pressure and Temperature Rating	50 psig, 100°C 100 psig, 50°C
Operating Range	0-14 pH
Mounting	Threaded in-line: 3/4" MNPT threaded nose for installation into process, sample line or automatic cleaning system. Insertion depth user specifiable Submerged: 3/4" MNPT threaded top for connection to 3/4" FNPT coupling and extension pipe
Wetted Materials	Kynar, porous Teflon, Viton, Ryton, EPDM & Silicon
Cable Options	20 ft (6.1 m) and 50 ft (15.2 m) integral ferrule terminated leads or 10 inch integral VarioPin connector
Temperature Sensor	8550 Ohm Thermistor, Pt1000 RTD
Weight	Approximately 0.23 kg (0.5 lb)

3. Dimensions

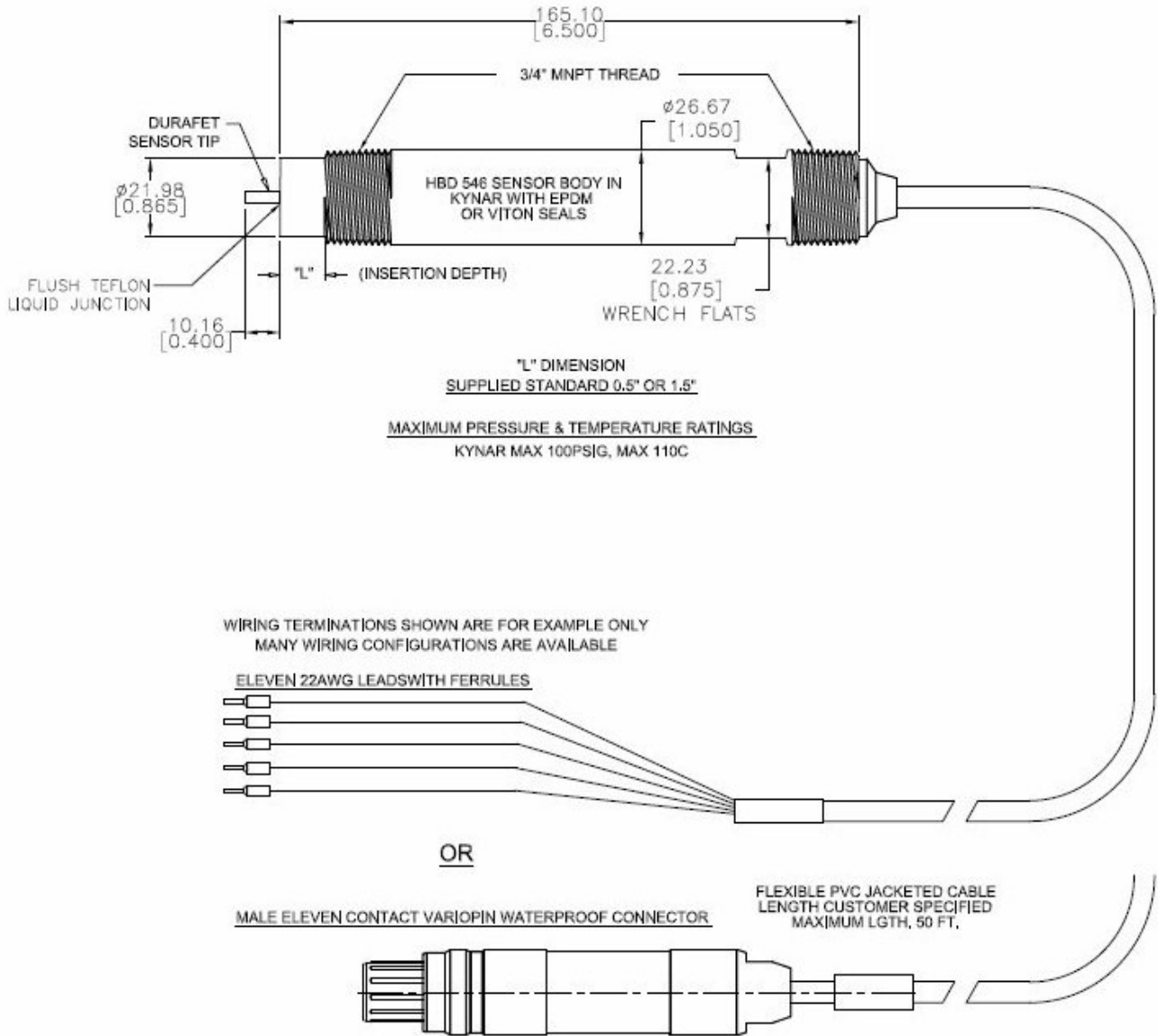


Figure 3-1 Dimension Drawing

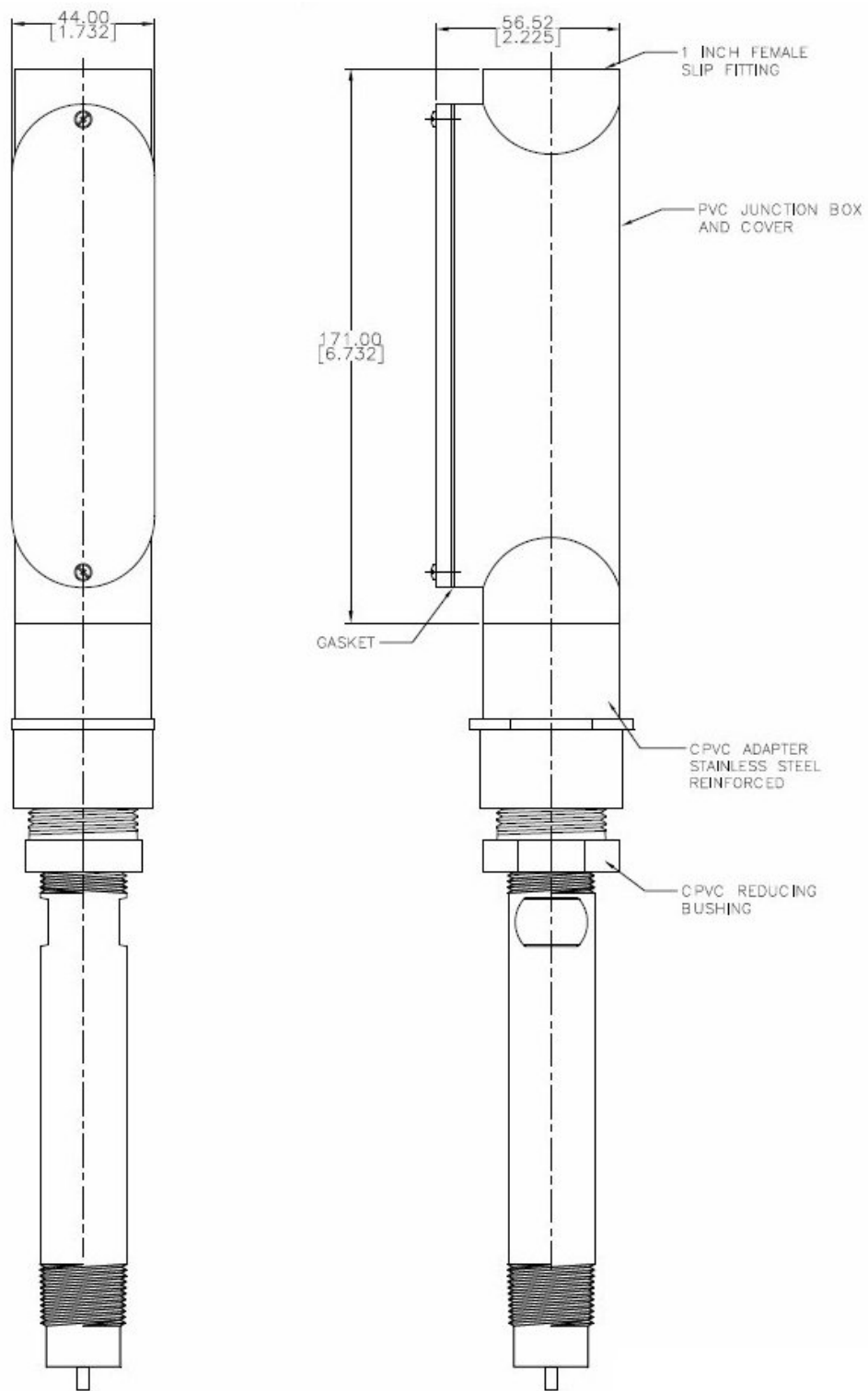


Figure 3-2 Dimension Drawing

4. General Assembly Instructions

4.1 Selecting Materials of Construction

Electrode

The materials used in the construction of the Durafet pH electrode are listed in the specifications. Materials of wetted parts must be compatible with the process temperature and corrosion conditions.

User-supplied components

Pipe couplings, and tees must be supplied by the user. Select materials that are compatible with the process temperature and corrosion conditions.

4.2 Sealing Pipe Joints

When making pipe joints apply Teflon tape pipe sealant to male threads. Wrap the threads with the tape overlapping by 50% on each wrap. Start the wrap at the end of the pipe and wrap in the direction of the thread at least two turns. When installing an electrode, apply Teflon tape to the threads, then hand-tighten the electrode in the fitting only until snug. If necessary to stop a leak, a wrench may be applied to the electrode's wrenching flats to further tighten the joint only until the leak has stopped. Always leave at least one thread on the electrode showing outside the fitting.

CAUTION

When tightening an electrode never exceed 15 ft-lb applied torque. Applying too much torque can result in damage to the electrode.

4.3 Durafet Electrode Preparation

4.3.1 Unpacking

To safely unpack your Durafet Electrode, use the following procedure:

1. Carefully remove the electrode from the shipping carton.
2. Remove the plastic storage cap from the sensing end.
3. The fluid inside the cap is water. The water protects the porous reference junction from drying during shipment and storage.
4. Keep the black anti-static cap over the electrical connection end until you are ready to connect the electrode cable.
5. Save the black connector cap for ESD protection whenever the electrode cable is disconnected.
6. Any excess salt crystals on the sensor can be removed by placing the electrode under warm tap water until dissolved. If electrical connector end is wet, wipe dry before connecting to cable.

4.3.2 Precautions

- Do not allow liquids or other foreign matter to contact the cable connectors. Leave the protective cap in place on the electrode connector whenever the cable is not installed on an electrode.
- Avoid touching sensor area. Pressure applied to this area could damage the sensor.
- Avoid contaminating electrical connector contacts. Contamination can result in electrical leakage paths that affect the accuracy of pH measurements.
- Always replace the plastic storage cap over the sensor when the electrode is not in use. Be sure to reinstall the anti-static connector cap whenever the electrode is removed from service. Ensure that the plastic storage cap is filled with water.
- Do not expose the electrode to hydrofluoric acid.
- The sensor will have a reduced service life in processes that use high temperatures in combination with alkaline conditions. Do not install electrodes where temperatures go below $-10\text{ }^{\circ}\text{C}$ ($+14\text{ }^{\circ}\text{C}$) or freeze damage may result. Observe upper temperature limit specifications.
- In abrasive process streams, the electrode should be oriented so that the sensor surface faces downstream. In oily process streams, orient the sensor so that it faces 90° to the process flow.
- Promptly remove any water that might inadvertently come in contact with the electrode connector or cable connector. Blow drying with clean, low-pressure (15 psi) instrument air is a simple and effective means for drying the connector(s).

4.3.3 Cable Connection

Make sure electrode connector and cable connector are clean and dry. Align key way on VarioPin connector of electrode with tab inside mating connector on cable. Press cable connector onto electrode firmly. Tighten knurled bushing of cable connector by hand to ensure waterproof seal.

4.3.4 Shelf Life and Storage

Description

Periodic maintenance is required to ensure that the electrode does not dry out after prolonged shelf storage. Stored electrodes should be checked every 6 months to ensure that the water is still in the storage cap. The procedure below should be performed once per year for stored electrodes.

1. Remove the electrode from its storage box and remove the plastic cap from the sensing end.
2. Remove any excess crystals on sensor area by rinsing with warm tap water.
3. Refill the cap with distilled water.
4. Replace the cap on the electrode.
5. Place electrode in its storage box.
6. Mark the date on the box

ATTENTION

Do not store electrode at or below $-10\text{ }^{\circ}\text{C}$ ($+14\text{ }^{\circ}\text{F}$) or above $50\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F}$)

4.3.5 Cleaning

Overview

The frequency of cleaning is dependent on process conditions. Some process materials tend to adhere to the sensor and could interfere with the accuracy or time response of measurements. Note the following information before attempting to clean your electrode.

- Remove the electrode from service.
- Disconnect the cable from the electrode.
- Install anti-static electrode connector cap.
- Placing the electrode under flowing warm tap water will normally remove loose or lodged debris.
- Oil deposits can be removed using a household detergent (Joy or Windex) or a laboratory detergent (Micro or Sparkleen).
- The Kynar electrode body can be cleaned with almost any cleaning agent.
- Use dilute hydrochloric acid or other dilute acid to clean mineral scaling off the sensor. After cleaning, rinse thoroughly in distilled water. Allow it to soak for an hour in a neutral buffer (i.e. - 6.86 pH buffer, Honeywell Part Number 31103002).
- The sensor area can be wiped gently with a soft wet cotton swab.

4.4 Cap Adapter Option for Durafet Electrodes

The Cap Adapter cable option for Durafet electrodes eliminates the need to separately mount a preamplifier. The Cap Adapter cable contains a preamplifier electronics module that is integral with the electrode-to-instrument cable. The cable has tinned leads that are ready to be wired directly to UDA Analyzer or APT2000/4000 Transmitters and Analyzers. The knurled fitting should be hand-tightened onto the VarioPin connector of the electrode to seal an internal O-ring. When properly threaded onto the electrode the connection is waterproof.

5. Immersion Mounting

5.1 General Information

Intended Use

The system can be used in a variety of configurations to accommodate many techniques for support, immersion, and removal of the electrode in a process solution. A variety of mounting configurations are used according to the process application. By using accessory parts such as pipe, pipe fittings and cable grips, an immersion assembly can be built to suit a specific application.

Minimum immersion depth

In all cases, the electrode body should be immersed a minimum of 5.08 cm (2 in.) into the process liquid to ensure proper temperature compensation.

Suggested support arrangements

Figure 5-1 illustrates possible support arrangements for immersion mounting of the Durafet electrode.

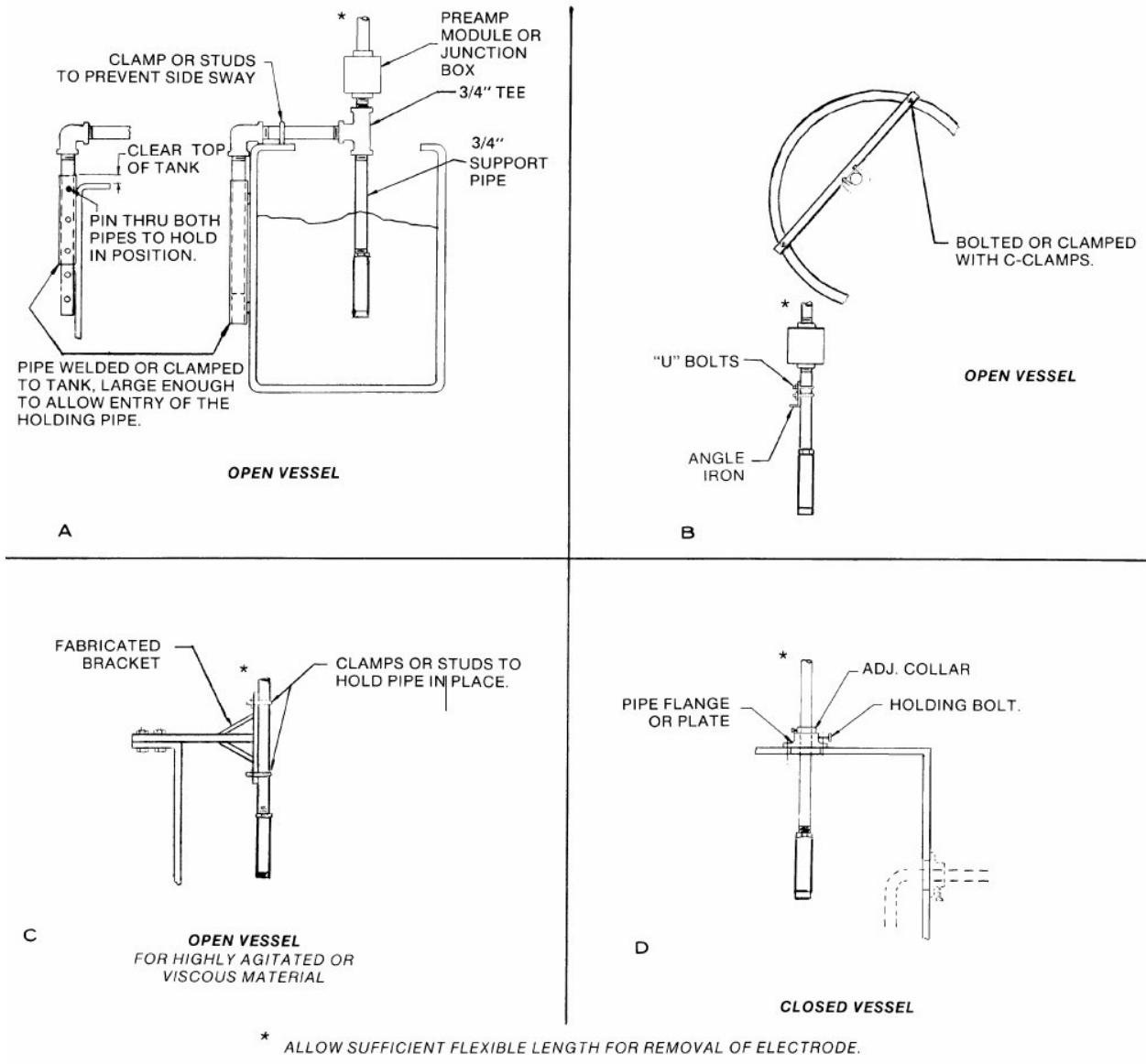


Figure 5-1 Suggested Support Arrangements

5.2 Direct Electrode-to-Instrument Applications

Application

Figure 5-2 illustrates this configuration.

Materials required

The material supplied with this catalog number is listed below.

Quantity	Item
1	Durafet Electrode with slotted tip and cable

Materials supplied by the user are listed below.

Quantity	Item
1	Length of 3/4 in. Sch. 40 pipe, threaded on both ends. Pipe length to be determined by user. When planning pipe length, allow enough cable between the pipe and the instrument to permit removal for servicing.
2	3/4 in. NPT metal Sch. 40 pipe couplings
1	3/4 in. NPT cable grip for 1/8 in. diameter cable

Assembly

Assemble the materials as shown in Figure 5-2

CAUTION

Do not push excess electrode cable into the immersion pipe or pipe coupling.

Dimensions

For mounting dimensions, see Dimensions 3.

Cable electrode to instrument

Cable electrode to instrument as described in Electrical Connections in section 9.

Pressure test

Perform a submersible pressure test (see Pressure Test 6).

Mounting

Mount the assembly. See Figure 7-1 for mounting suggestions.

Arrangement of components

Figure 5-2 illustrates the configuration of components used for direct connection of the electrode to the instrument without an external preamplifier module or external preamp adapter.

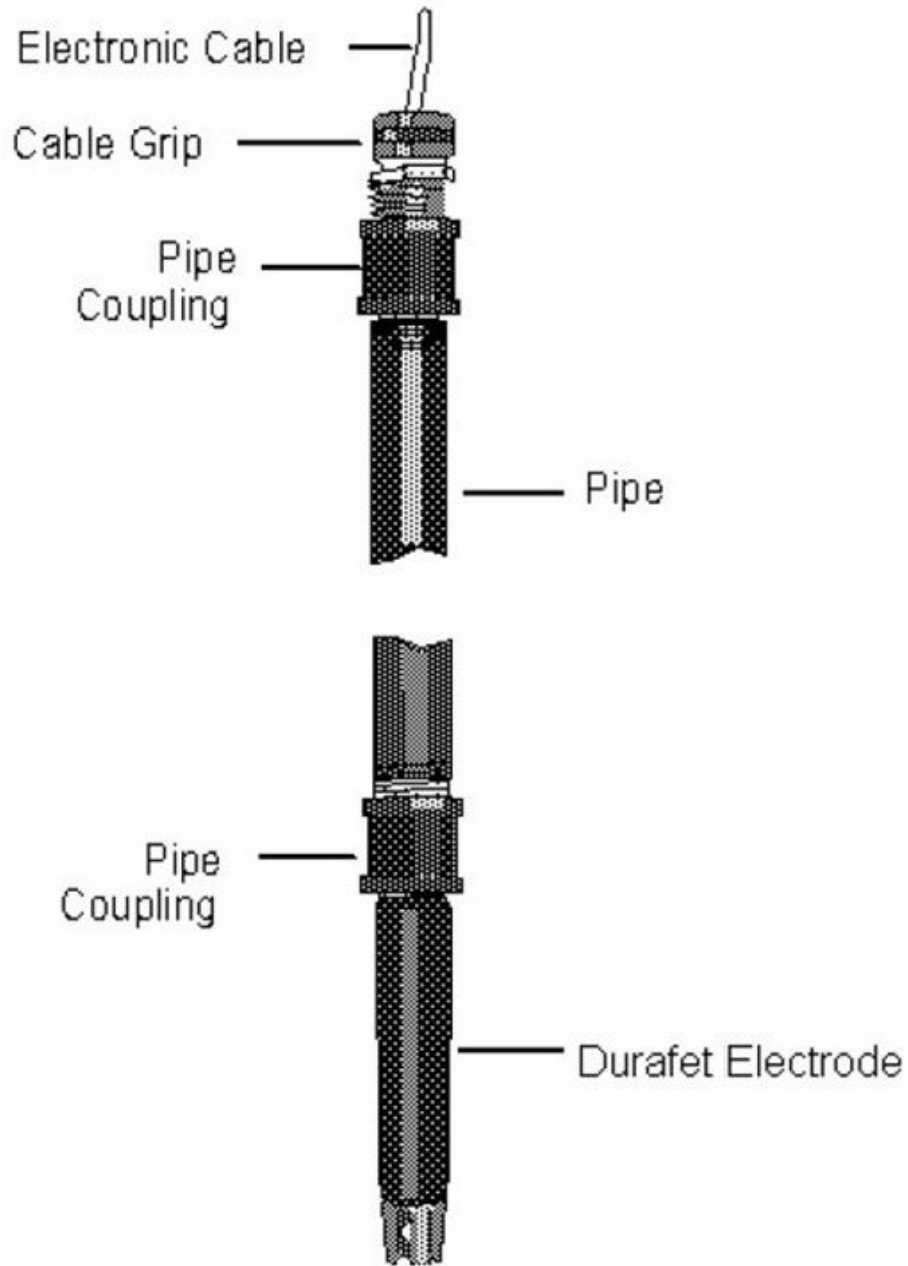


Figure 5-2 Direct Electrode-to-Instrument Connection

6. Pressure Test

When to perform the test

Before submerging an assembly do a low-pressure test to check the various seals made during the assembly operation.

How to perform the test

Table 6-1 lists the steps for pressure testing the assembly.

Table 6-1 Instructions for Pressure Test

Step	Action
1	Double back the cable into the immersion pipe.
2	Connect a source of low-pressure air to the immersion pipe. [Approximately 69 kPa (10 psi) will simulate 6.10 m (20 ft) of water.]
3	Immerse the assembly in a shallow tank of water and look for any indication of air bubbles streaming from the assembly.
4	To seal leaking connections: <ul style="list-style-type: none">• Use extra Teflon tape on pipe joints.• Use silicone grease on O-ring seals.• Make the connecting rings on the preamplifier snug.

7. In-Line Mounting

7.1 General Information

Choice of pipe tee

This mounting allows the electrode body to be inserted directly into a Schedule 40, 3/4 in. NPT metal pipe tee in a pipe line. The electrode will NOT fit into standard PLASTIC pipe tees.

Avoiding damage to the electrode

The Durafet electrode for in-line mounting has an exposed sensor. Exercise care when inserting or removing the electrode from the pipe tee to prevent damage to the sensor surface.

Ensuring accurate temperature sensing

When process temperature varies considerably from ambient temperature, insulate the entire Durafet electrode body to ensure accurate process temperature sensing.

Orientation of electrode

For reliable measurement, the electrode must be immersed in the process fluid. Therefore, orientation of the electrode vertical to the horizon is not recommended, as this orientation may prevent sufficient depth penetration to reliably immerse the sensor. The electrode mounting angle should be at least 45 degrees from vertical as shown in Figure 7-1. If solids are present in the process fluid, avoid angles exceeding 90 degrees from vertical to minimize accumulation of solids around the sensor.

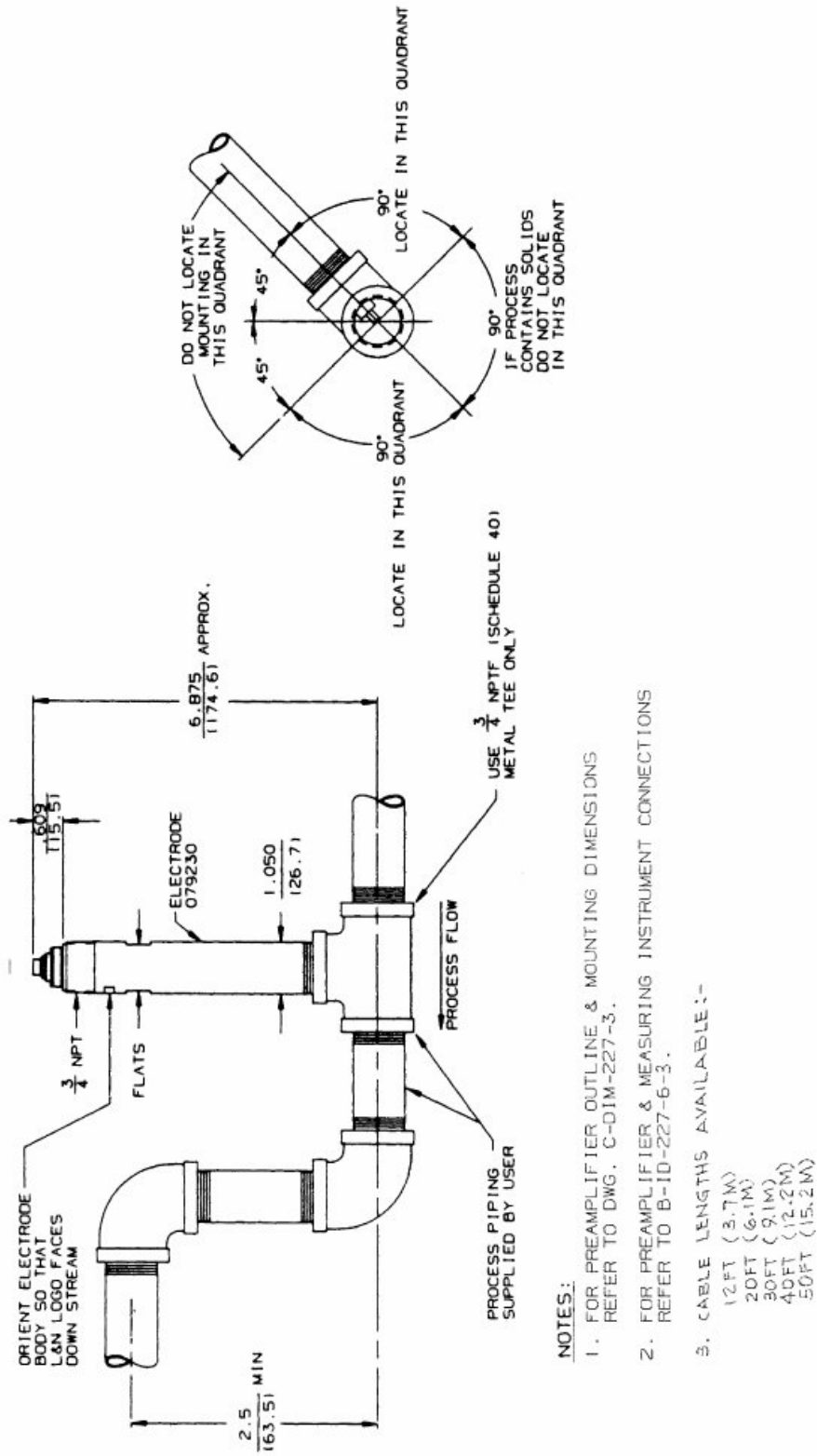


Figure 7-1 Proper Mounting Angle for Electrode

8. Maintenance, Standardization, and Replacement Parts

8.1 Maintenance

Keeping electrode moist

When an electrode is removed from the process for any reason, assure that it does not become dry and remain dry for more than a short period of time. The electrode may require more frequent maintenance if used in a batch treatment installation which leaves the electrode dry between batches, or if it is exposed to process fluids that leave a deposit on the surface of the sensor chip (measuring electrode) and reference electrode. The manual supplied with the electrode contains instructions for cleaning the electrode. Thoroughly rinse the electrode with water after any type of cleaning. In addition to periodic cleaning, other electrode maintenance includes electrode performance checks, and treatment for a clogged junction or severely dry electrode.

8.2 Standardization

In addition to electrode maintenance, successful pH measurement relies on periodic standardizing of the measurement instrument and its electrode system. (This is required because all electrodes do not produce exactly the same potential in a solution of known pH. A periodic corrective adjustment eliminates any deviation from the standard value.) Establish regular intervals for standardizing according to conditions and experience. Procedures for standardizing are given in the measuring instrument instructions.

8.3 Accessories, Replacement Parts, Cables

Table 8-1 Accessories, Replacement Parts, Cables

Description	Part Number				
Accessories					
NIST Buffer – 4.01 pH	31103001				
NIST Buffer – 8.86 pH	31103002				
NIST Buffer – 9.18 pH	31103003				
Replacement Parts					
ESD Protective cap for VarioPin Connector	51500474-003				
Cables					
Extension Cables - Only compatible with pH electrodes with lead terminations = VP (Direct Connect to UDA2182) Connection to instrument is ferrule terminated leads: <table data-bbox="909 1050 1443 1144" style="margin-left: auto; margin-right: 0;"> <tr> <td style="padding-right: 20px;">20'</td> <td>50001391-501</td> </tr> <tr> <td>50'</td> <td>50001391-502</td> </tr> </table>	20'	50001391-501	50'	50001391-502	
20'	50001391-501				
50'	50001391-502				
Extension Cables - Only compatible with pH electrodes with lead terminations = VP (Cap Adapter Cables) Connection to instrument is ferrule terminated leads: <table data-bbox="909 1260 1443 1360" style="margin-left: auto; margin-right: 0;"> <tr> <td style="padding-right: 20px;">20'</td> <td>51453388-501</td> </tr> <tr> <td>50'</td> <td>51453388-502</td> </tr> </table>	20'	51453388-501	50'	51453388-502	
20'	51453388-501				
50'	51453388-502				
Junction Box	50072803-501				
Electrode Protector (for submersible electrode applications only)	31075715				

9. Electrical Connections

9.1 Inputs and Outputs to the UDA2182

9.1.1 Introduction

The analyzer can accept single or dual inputs from Honeywell Direct pH, pH Input from External Preamplifier, ORP, contacting conductivity and dissolved oxygen sensors.

- Two analog outputs standard
- One additional output optional
- Two electromechanical relays standard
- Two additional relays optional
- Two Digital Inputs

Wiring these inputs and outputs is described here.

9.1.2 Accessing the terminals

The wiring is easily accessible through the front and the boards can be pulled out to facilitate the wiring of sensor input.

Open the case.

Loosen the four captive screws on the front of the bezel.

Grasp the bezel on the right side. Lift the bezel gently and swing the bezel open to the left.

Wiring terminals and board location

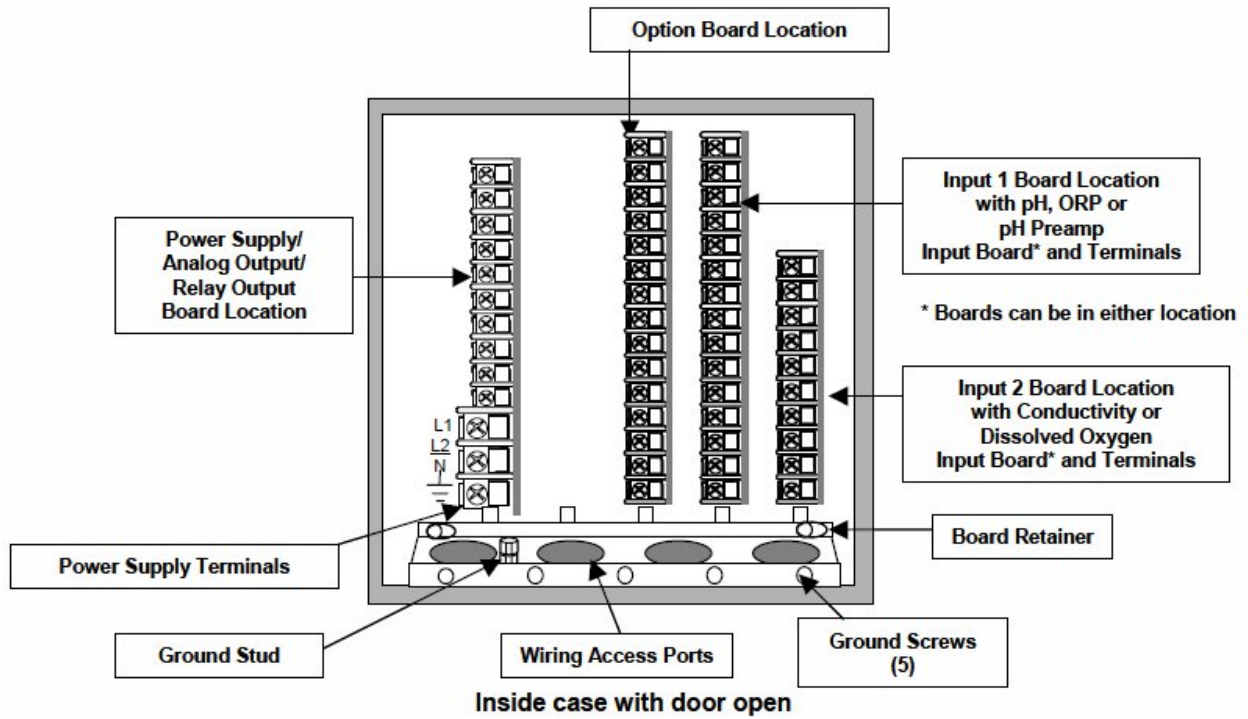





Figure 9-1 Wiring Terminals and Board Location



WARNING

While the unit is powered, a potentially lethal shock hazard exists inside the case. Do not open the case while the unit is powered.

Table 9-1 Procedure for installing Input and Output wiring

Step	Action
1	Go to Configuration setup to view the displays showing analog input, relay, and analog output use. Note the assignments shown. You must wire the unit to match these assignments in order for the analyzer to work as expected.
ATTENTION	
  Turn off the power to the analyzer. More than one switch may be required to remove power.	
2	With power off, open the case: <ul style="list-style-type: none"> • Loosen the four captive screws on the front of the bezel. • Grasp the bezel on the right side. Lift the bezel gently and swing the bezel open to the left.
3	Refer to UDA2182 manual for the location of the terminal board retainer. Loosen the screws that hold the retainer and slide the retainer left until the retainer tabs disengage from the terminal boards.
4	Insert a screwdriver into the tab in the terminal board to be wired and pull out gently. Slide the board half way out. There is a notch in the terminal board into which you can slide the retainer tabs and hold the boards in place while wiring.
5	Connect the inputs from the electrode or cells to the terminals in accordance with the configuration setup assignments. Refer to the wiring diagram provided (Section 7.2) with the electrode or cell.
6	Analog outputs (In addition to the standard outputs, one more is available as an option). See Option Board Wiring in manual for UDA2182). Connect the outputs from the Analyzer terminals in accordance with the configuration setup assignments. Refer to the wiring diagrams provided with the field devices receiving the signals.
7	If the relay outputs are to be used, leave the unit open and powered down. The relays can be used for Time Proportioning Output, Pulse Frequency Output, and Digital Output control as well as alarm annunciation. (In addition to the standard relays, two more are available as an option. See Option Board Wiring –in manual for UDA2182). Connect the outputs from the Analyzer terminals in accordance with the configuration setup assignments. Refer to the wiring diagrams provided with the external device. These relays can be programmed to de-energize or energize on alarm. Use the Maintenance configuration setup to specify relay state. (NOTE 1)
 CAUTION: Alarm circuits are not internally fused in the analyzer. Provision for fuses in external circuits is recommended.	
8	Slide the retainer to the left then slide the terminal board back into place. Slide retainer to engage the tabs and tighten the screws.
9	Close the Bezel and secure four captive screws to a torque value of .20Nm (1.5 Lb-in). Power up the unit. Do not apply power until the bezel is closed.

Note 1: If set to de-energize on alarm, this means that when an alarm occurs (or the discrete control point becomes active), the relay coil will be de-energized. The NC contacts will then be closed and the NO contacts will be open. Conversely, during normal non-alarm operation (or when the control point is not active) the NC contacts will be open, and the NO contacts will be closed.

If de-energize on alarm is selected, a power loss will force all relays to the same position as an alarm condition.

Identify Your Wiring Requirements

To determine the appropriate diagrams for wiring your analyzer, refer to the model number interpretation in this section. The model number of the analyzer is on the outside of the case.

Wiring the Analyzer

Using the information contained in the model number, refer to the individual diagrams listed to wire the analyzer according to your requirements.

1.1 HBD Series 546 pH Input Wiring Diagrams to UDA2182

Durafet

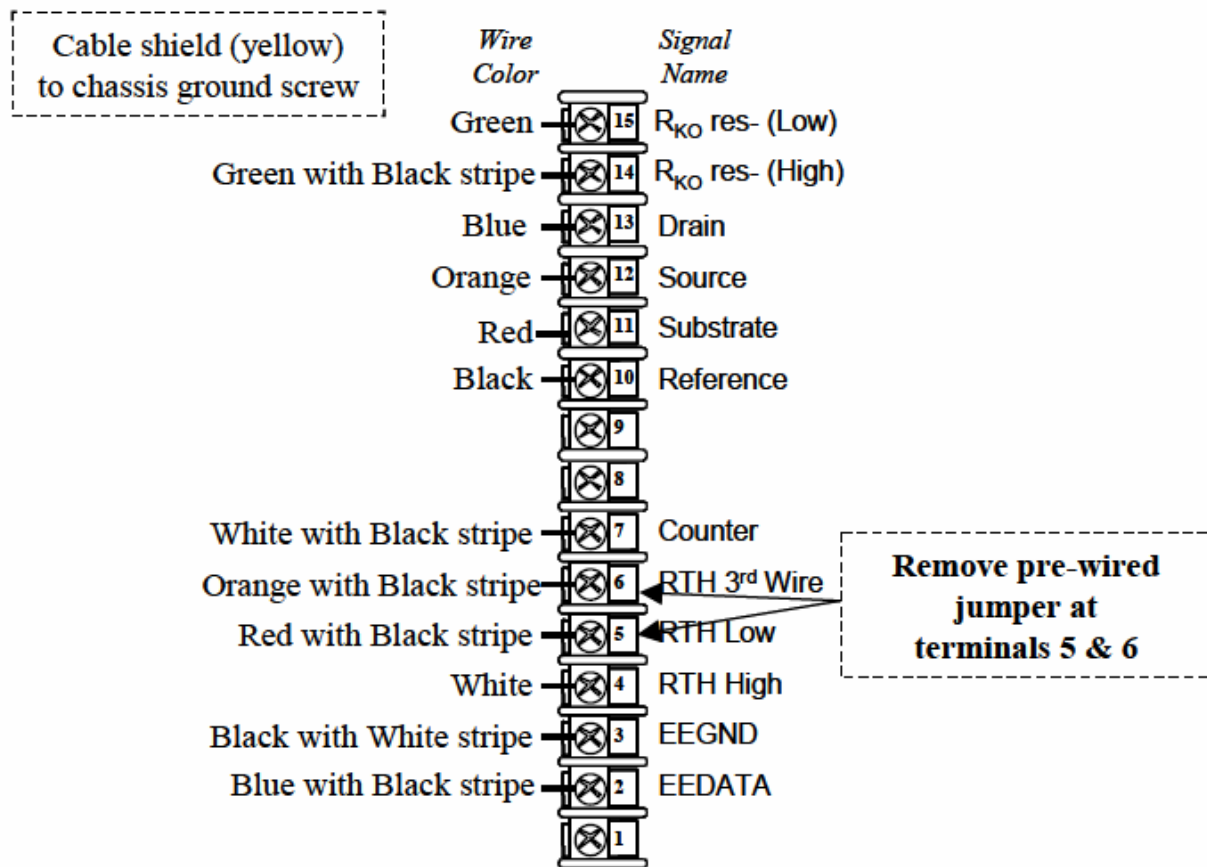


Figure 9-2 Terminal Designations for Durafet Electrode

Durafet Cap Adapter

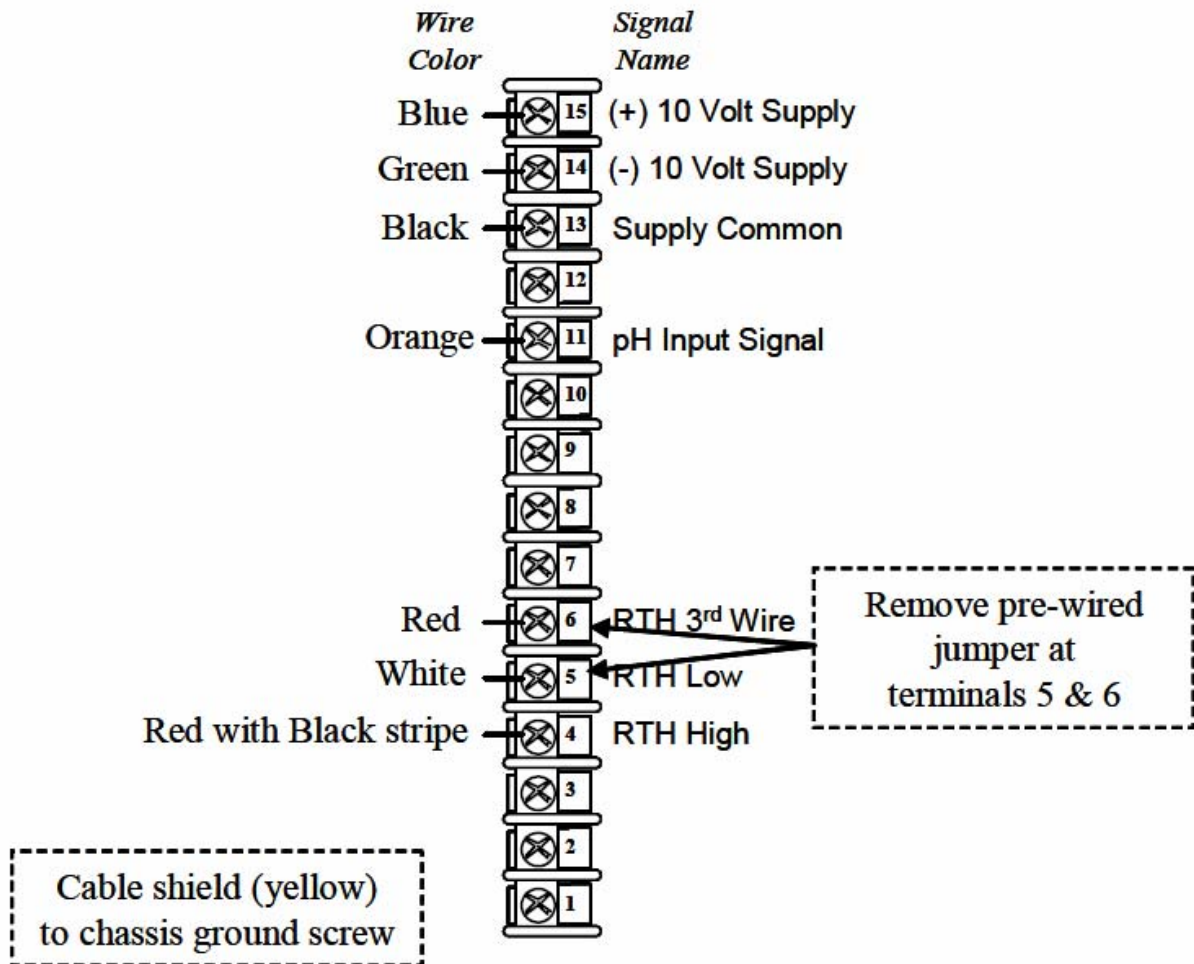


Figure 9-3 Terminal Designations for Durafet Electrode with Cap Adapter

NON-HAZARDOUS LOCATION

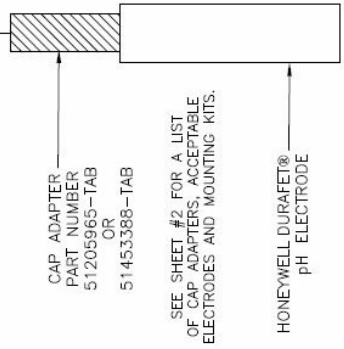
OR
 HAZARDOUS (CLASSIFIED) LOCATION
 AS IDENTIFIED ON THE PRODUCT LABEL

ANY FMRC APPROVED SINGLE MULTI-CHANNEL BARRIER OR EQUIPMENT (i.e., PH TRANSMITTER) OR MULTIPLE SINGLE CHANNELS OF BARRIERS APPROVED FOR THE CONFIGURATION WITH APPROPRIATE (ENTITY) I.S. OUTPUTS OR NON-INCOGNITIVE FILED WIRING PARAMETER (WITH Vt AND It PARAMETERS) (NOTES 2, 3, & 6)

CABLE CAPACITANCE = 27pF / FOOT
 CABLE INDUCTANCE = 20uH / FOOT
 (AT A MAXIMUM CABLE LENGTH OF 50 FEET,
 Ccable = 1350pF AND Lcable = 1000uH)

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, DIVISION 1, GROUPS A,B,C, AND D
 CLASS I, ZONE O, GROUP IIC
 CLASS II, DIVISION 1, GROUPS E,F AND G
 CLASS III, DIVISION 1
 CLASS I,II,III, DIVISION 2, GROUPS A,B,C,D,F AND G
 CLASS I, ZONE 2, GROUP IIC



CAP ADAPTER I.S. ENTITY PARAMETERS
 AND IN FIELD WIRING PARAMETERS
 Vmax OR Ui = 20 V
 Imax OR Ii = 200 mA
 Ci = 0.26 uF
 Li = 0
 Pmax OR Pi = 0.75 W
 (NOTE 1)

Figure 9-4 Cap Adaptor IS Control Drawing (page 1 of 3)

CAP ADAPTER PART NUMBERS

51205965-001, 12 FT. CABLE
51205965-002, 20 FT. CABLE
51205965-005, 50 FT. CABLE
51205965-006, 4 FT. CABLE
51205965-007, 8 FT. CABLE
51453388-001, 20 FT. CABLE
51453388-002, 50 FT. CABLE

ELECTRODE MOUNTING KITS

7773D
7774D
7758D
7777D
7794D
TL1000
7777DVP
7794DVP
HBD546
HBD547
HBD551

DURAFET®pH ELECTRODES

51205554-001	51450948-001
51205554-002	51450948-002
51205554-008	51450948-003
51205554-009	51450948-004
51205554-010	51450948-005
51205554-011	51450948-006
51204976-001	51451346-001
51204976-006	51451346-002
51204976-007	51451346-003
51204976-008	51451346-007
51204976-009	51453535-001
51453503-001	51453535-002
51453503-005	51453535-003
	51453535-004
	51453535-005
	51453535-006
	50072804-001 THRU -036
	50072805-001 THRU -036
	50072806-001 THRU -036

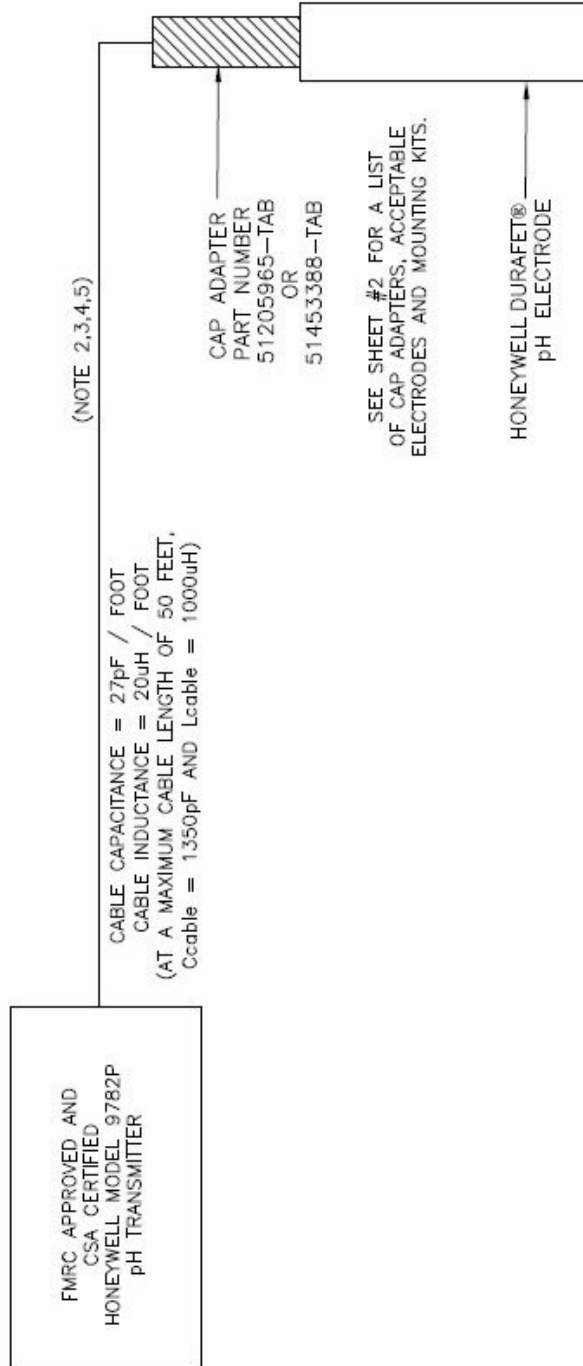
INSTALLATION INSTRUCTIONS

VOLTAGE RATING: ± 3 VDC TO ± 16 VDC
CURRENT RATING: 3.4mA MAX. AT 16 VDC
INSTALLATION CATEGORY: II
POLLUTION DEGREE: 2
MAX. AMBIENT TEMPERATURE: 70°C

Cap Adaptor IS Control Drawing (page 2 or 3)

NON-HAZARDOUS LOCATION

CLASS I, DIVISION 2, GROUPS A, B, C AND D



Cap Adaptor IS Control Drawing (page 3 of 3)

HBD Series 546 pH Input Wiring Diagram to APT2000 and APT4000

The Cap Adapter can be connected to the APT2000 pH Transmitter. (See the APT2000 pH Transmitter Manual, part number 70-82-25-92, for more detailed description of the APT2000.)

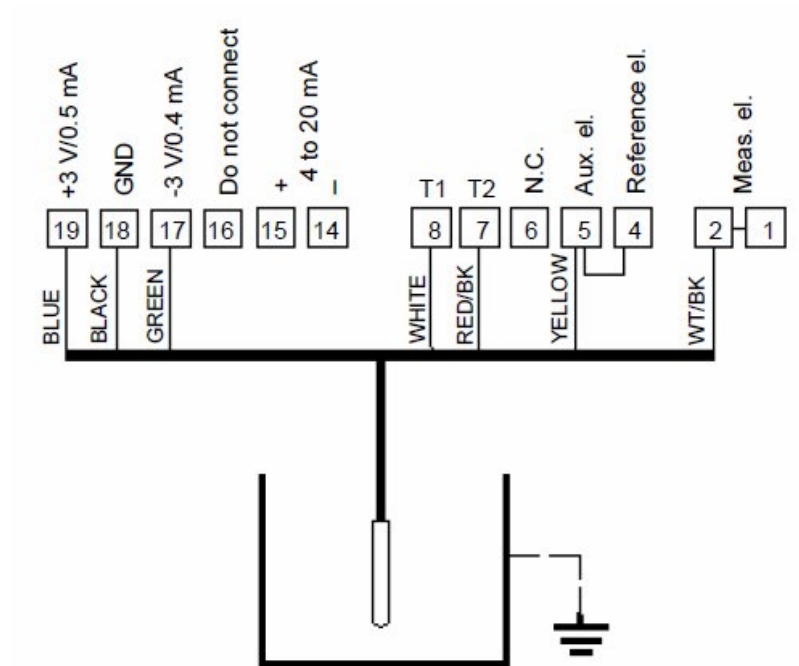


Figure 9-5 Connecting to an APT2000 pH Transmitter

NOTE: Orange and Red wires are not typically connected. These should be clipped and electrically sealed to avoid possible contact with other conductors.

9.2 Connection to an APT4000 pH Analyzer

The Cap Adapter can be connected to the APT4000 pH Analyzer. (See the APT4000 pH Analyzer Manual, part number 70-82-25-103, for more detailed description of the APT4000.)

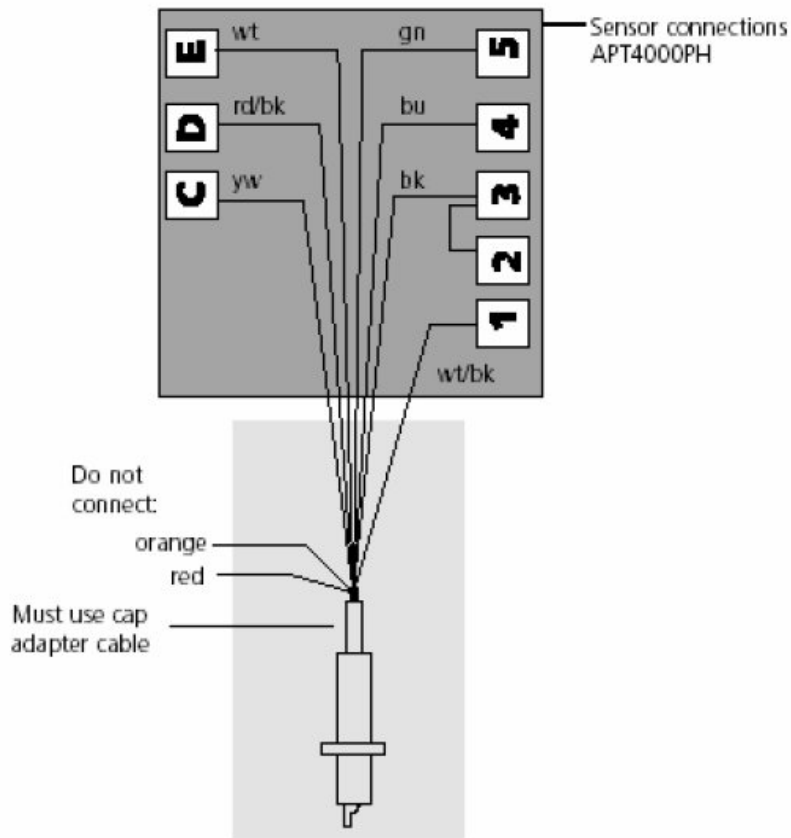


Figure 9-6 Connecting to an APT4000 pH Analyzer

Sales and Service

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

ASIA PACIFIC

(TAC) hfs-tac-support@honeywell.com

Australia

Honeywell Limited
Phone: +(61) 7-3846 1255
FAX: +(61) 7-3840 6481
Toll Free 1300-36-39-36
Toll Free Fax:
1300-36-04-70

China – PRC - Shanghai

Honeywell China Inc.
Phone: (86-21) 5257-4568
Fax: (86-21) 6237-2826

Singapore

Honeywell Pte Ltd.
Phone: +(65) 6580 3278
Fax: +(65) 6445-3033

South Korea

Honeywell Korea Co Ltd
Phone: +(822) 799 6114
Fax: +(822) 792 9015

EMEA

Phone: + 80012026455 or +44
(0)1202645583

FAX: +44 (0) 1344 655554

Email: (Sales) sc-cp-apps-salespa62@honeywell.com
or

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Or 1-800-343-0228

Email: (Sales) ask-ssc@honeywell.com or

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SOUTH AMERICA

Honeywell do Brazil & Cia

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FAX: +(55-11) 7266-1905

Email: (Sales) ask-ssc@honeywell.com or

(TAC) hfs-tac-support@honeywell.com